

Trend Study 11B-3-05

Study site name: Airport.

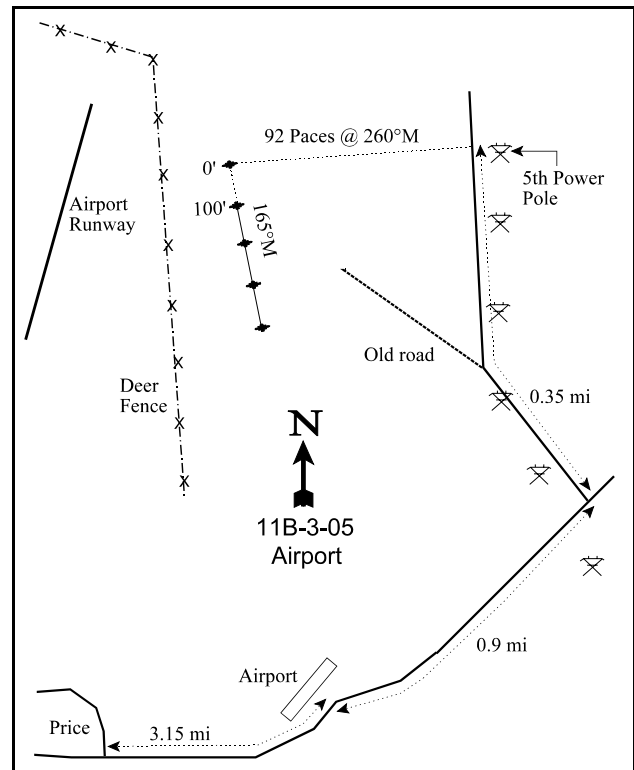
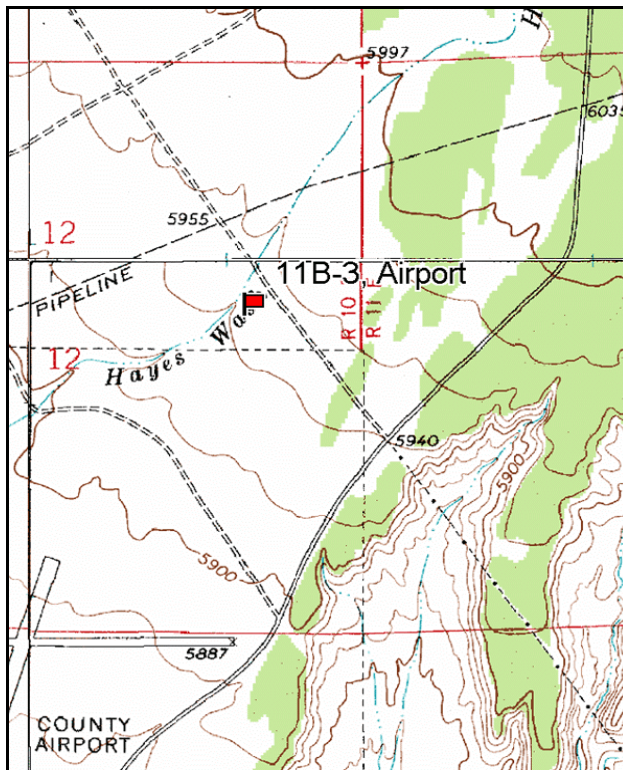
Vegetation type: Chained, Seeded P-J.

Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (51ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of Main Street and the Airport Road in Price, go 3.15 miles to the airport. Continue on the paved road 0.9 miles past the Carbon County Airport to a point where two power lines cross the road and there is a dirt road turning off to the left. Turn on this road and follow the power line 0.35 miles to the fifth wooden pole. Stop here. Walk west 92 paces @ 260°M to the start of the baseline, a rebar tagged #7891.



Map Name: Wellington

Diagrammatic Sketch

Township 14S , Range 10E , Section 12

GPS: NAD 27, UTM 12S 4385891 N, 522162 E

DISCUSSION

Airport - Trend Study No. 11B-3

This study site is located on a sagebrush flat one mile north and slightly east of the Carbon County Airport. The large flat extends several miles north to the higher benches and mesas of the West Tavaputs Plateau. Elevation on the flat is 5,950 feet. Mature juniper stands border the east side. This area was dominated by Wyoming big sagebrush with scattered Juniper and then was chained and drill seeded with crested wheatgrass in 1965-66 by the BLM. Now the area supports a moderately low density of Wyoming big sagebrush with a crested wheatgrass understory. Sometime after the 1994 reading, the Carbon County Airport was expanded with a longer runway. A large deer fence now encloses the airport and is only about 300 feet west of the study site, which may concentrate more deer use on the site. Quadrat frequency of deer pellet groups was quite low in 1994 at only 8%. In 2000, frequency increased to 22% and 18% in 2005, which is still moderately low. A pellet group transect read along the baseline in 2000 provided an estimated 23 deer days use/acre (57 ddu/ha). All of the deer pellet groups appeared to be from winter use. As part of the Hayes Wash allotment, this area is grazed by 61 cattle from mid-October to the end of May. Utilization of the crested wheatgrass appeared to be moderate to heavy in 1986, but light in 2000 with only a few old cattle pats encountered. In 2005, pellet group data estimated 27 deer and 10 cow days use/acre (68 ddu/ha and 25 cdu/ha). Half of the deer pellets were from winter and half from spring. The cow pats were all from winter. Deer bones were found on the site in 2005.

The soil is moderately deep with an effective rooting depth of just over 14 inches. Depth is limited in some areas by a hardpan at about 7 inches in depth which could restrict the density of adult Wyoming sagebrush. The soil has a sandy clay loam texture with a slightly alkaline pH of 7.8. Phosphorus levels were measured at 7.5 ppm, where values below 6 ppm may hinder normal plant growth and development in wildland soils (Tiedemann and Lopez 2004). Organic matter is low at only 1%, which is the lowest reading on the entire unit. Small gravel is common within the profile and concentrated on the surface, indicating soil loss in the past. Some of the gravel is coated with white calcium-carbonate. No gullies are evident. Rows of seeded crested wheatgrass are contoured to the slight slope which limits erosion and also helps the buildup of litter. Windrowed piles of juniper and sagebrush are remnants of the pre-treatment of the flat. The erosion condition class determined soil movement as stable in 2005.

The site has supported a moderate stand of Wyoming big sagebrush with just over 1,000 plants/acre estimated in 1986 and 1994, which increased to 2,280 plants/acre in 2000, and continued to increase to 3,180 plants/acre in 2005. Sagebrush cover increased from 4-5% in 1995 and 2000 to 9% in 2005. Forty-seven percent of the plants sampled were decadent in 1986, but this decreased to only 14% by 1994, 11% in 2000, and 8% in 2005. Recruitment in the form of seedlings and young is excellent. In 2000, 32% of the population consisted of young plants, indicating an expanding population. This percentage increased in 2005 to 57% of the population. Use of sagebrush was extremely heavy in 1986, 88% of the plants sampled were heavily hedged. On some plants, the new growth was short and unavailable due to the clubbed aspect of the plant. Use was much lighter in 1994, with only 2% of the sagebrush displaying heavy use. During the 2000 and 2005 readings, use was mostly light to moderate with only 4% of the plants sampled displaying heavy use. Some sagebrush on this site display characteristics of black sagebrush (*Artemisia nova*), and mountain big sagebrush (*Artemisia tridentata vaseyana*). There is obviously some hybridizing occurring between the sagebrush subspecies. Plants with the heaviest use appeared to have more characteristics of mountain big sagebrush, which is the most palatable of the sagebrush subspecies.

Other preferred browse plants include a few green ephedra and fourwing saltbush. Broom snakeweed had been the most numerous shrub on the site and, similar to other trend sites in the area, it had increased in density by 2005. Density was estimated at only 266 plants/acre in 1986 which increased to 420 by 1994. In 2000, the population had exploded to 8,940 plants/acre. In 2005, this population had declined to 1,460 plants/acre.

Crested wheatgrass had completely dominated the herbaceous component by providing almost 100% of the herbaceous understory cover, until a large dieoff occurred between 2000 and 2005. Crested wheatgrass cover decreased from 16% in 2000 to less than 1% in 2005. The reduction of crested wheatgrass is likely due to precipitation levels at 75% of normal from 2001-03. Other grass species are uncommon. Forbs are limited and have provided little forage except during wet, favorable springs, which occurred in 2005. Total forb cover increased from less than 2% in 2000 to nearly 13% in 2005. Annual forbs provided over 7% cover in 2005. Annual stickseed and pinnate tansy mustard were the dominant annual forb species. The dominant perennial forb species was scarlet globemallow, which provided 5% cover.

1986 APPARENT TREND ASSESSMENT

Past grazing management has maintained the crested wheatgrass which appears to have a stable trend. Although somewhat heavily used and putting on minimal growth, the sagebrush is reproducing and doing fairly well for such a low rainfall area (annual average of about 11 inches in Price). Therefore, the range trend appears stable, although continued heavy use of sagebrush could lead to a downward trend in terms of deer winter range. The soil is fairly well protected and the site is level so soil loss is not a major concern. Soil trend also appears to be stable.

1994 TREND ASSESSMENT

The soil trend is slightly down because of the loss of much of the litter cover and the increased percentage of bare ground. This trend has been noted throughout much of Utah especially at the lower elevation sites with the prolonged drought we have been experiencing since the late 1980's. This should turn around with near normal precipitation patterns. The browse trend is stable. The condition of the sagebrush has improved with decreases in those classified with moderate to heavy use (88% to 2%), decreased decadence (47% to 14%), and an increase in seedling recruitment (12% to 46%). Trend for the herbaceous understory is stable. The forb component for the herbaceous understory is almost nonexistent but nested frequency of scarlet globemallow has increased. The Desirable Components Index score was good due to moderate browse cover, moderate decadence, and only excellent perennial grass cover.

TREND ASSESSMENT

soil - slightly down (-1)

browse - stable (0)

herbaceous understory - stable (0)

winter range condition (DC Index) - Good (55) Lower Potential scale

2000 TREND ASSESSMENT

Trend for soil appears to be stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained unchanged. The relative cover of litter decreased slightly and relative cover of bare ground increased slightly, but not enough to affect the trend. The browse trend continues to improve with density increasing by 51% since 1994 and percent decadence declining from 14% to 11%. Young plant recruitment has increased from 16% to 32%. Use is mostly light to moderate with good vigor. The only negative aspect of the browse trend is the more than 20-fold increase in broom snakeweed density (420 to 8,940 plants/acre). Most of the population consists of mature and decadent plants so it does not appear that this population will continue to increase in the immediate future. The herbaceous trend appears stable with nested frequency of crested wheatgrass remaining stable. Forbs are still rare except for scarlet globemallow. The DCI score improved to excellent due to improvements in browse cover, browse decadence, and browse young recruitment.

TREND ASSESSMENT

soil - stable (0)

browse - up (+2)

herbaceous understory - stable (0)

winter range condition (DC Index) - Excellent (68) Lower Potential scale

2005 TREND ASSESSMENT

The trend for soil is stable. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground remained identical from 2000 to 2005. The trend for browse is up. The population of the key browse species Wyoming big sagebrush increased from 2,280 plants/acre in 2000 to 3,180 in 2005, all of the increase from an increase in young individuals. Accompanied by the increase in population is an increase of young from 32% (2000) of the population to 57% in 2005. The density of decadent individuals remained unchanged. The broom snakeweed on the study site decreased 84% from 8,940 plants/acre in 2000 to 1,460 in 2005. The herbaceous understory trend is down. This is due mainly due to a substantial (78%) decrease in the nested frequency of perennial grasses, mainly crested wheatgrass. The nested frequency of annual forbs increased greatly, with the majority of annual forb species being weedy species like pinnate tansymustard, annual stickseed, pepperweed species, and Russian thistle. The nested frequency of perennial forbs increased, but this increase is not enough to counter a decrease in perennial grasses and increase in weedy annual forbs. The DCI score decreased to good due to the large loss of perennial grass cover.

TREND ASSESSMENT

soil - stable (0)

browse - up (+2)

herbaceous understory - down (-2)

winter range condition (DC Index) - Good (54) Lower Potential scale

HERBACEOUS TRENDS --

Management unit 11B, Study no: 3

Type	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
G	Agropyron cristatum	_b 298	_b 289	_b 301	_a 59	15.34	16.43	.81
G	Agropyron dasystachyum	7	-	3	1	-	.01	.03
G	Agropyron trachycaulum	5	-	-	-	-	-	-
G	Bouteloua gracilis	-	-	-	7	-	-	.01
G	Oryzopsis hymenoides	1	-	-	-	-	-	-
G	Poa secunda	-	1	-	-	.00	-	-
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		311	290	304	67	15.34	16.44	0.85
Total for Grasses		311	290	304	67	15.34	16.44	0.85
F	Astragalus convallarius	1	-	5	6	-	.23	.18
F	Chaenactis douglasii	-	-	-	1	-	-	.00
F	Chenopodium fremontii (a)	-	_a -	_a -	_b 24	-	-	.06
F	Cirsium sp.	-	-	-	3	-	-	.00

T y p e	Species	Nested Frequency				Average Cover %		
		'86	'94	'00	'05	'94	'00	'05
F	<i>Cryptantha fulvocanescens</i>	-	-	-	9	-	-	.04
F	<i>Descurainia pinnata</i> (a)	-	a-	a-	b ¹⁴⁵	-	-	2.97
F	<i>Eriogonum cernuum</i> (a)	-	a-	a-	b ¹⁶³	-	-	.78
F	<i>Eriogonum ovalifolium</i>	-	1	-	-	.00	-	-
F	<i>Halogeton glomeratus</i> (a)	-	-	-	2	-	-	.00
F	<i>Lappula occidentalis</i> (a)	-	a-	a-	b ¹⁷⁴	-	-	3.40
F	<i>Leucelene ericoides</i>	-	-	3	3	-	.00	.38
F	<i>Lepidium</i> sp. (a)	-	a-	a-	b ²⁷	-	-	.23
F	<i>Orobancha fasciculata</i>	-	-	1	-	-	.00	-
F	<i>Salsola iberica</i> (a)	-	a-	a-	b ¹⁷	-	-	.03
F	<i>Sphaeralcea coccinea</i>	a ⁵⁰	ab ⁷⁹	a ⁶⁹	b ¹⁰⁴	.50	1.38	4.48
Total for Annual Forbs		0	0	0	552	0	0	7.49
Total for Perennial Forbs		51	80	78	126	0.50	1.63	5.10
Total for Forbs		51	80	78	678	0.50	1.63	12.59

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 11B, Study no: 3

T y p e	Species	Strip Frequency			Average Cover %		
		'94	'00	'05	'94	'00	'05
B	<i>Artemisia tridentata</i> <i>wyomingensis</i>	32	49	65	4.21	5.21	9.35
B	<i>Atriplex canescens</i>	1	1	1	.03	.03	.20
B	<i>Chrysothamnus viscidiflorus</i> <i>stenophyllus</i>	4	0	0	.15	-	-
B	<i>Ephedra viridis</i>	1	1	3	.38	.03	.15
B	<i>Gutierrezia sarothrae</i>	11	54	35	.52	2.72	2.67
B	<i>Opuntia polyacantha</i>	10	8	5	.00	.03	-
Total for Browse		59	113	109	5.30	8.03	12.38

CANOPY COVER, LINE INTERCEPT --

Management unit 11B, Study no: 3

Species	Percent Cover
	'05
<i>Artemisia tridentata wyomingensis</i>	7.48
<i>Ephedra viridis</i>	.05
<i>Gutierrezia sarothrae</i>	2.31

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 11B, Study no: 3

Species	Average leader growth (in)
	'05
<i>Artemisia tridentata wyomingensis</i>	2.5
<i>Atriplex canescens</i>	2.2

BASIC COVER --

Management unit 11B, Study no: 3

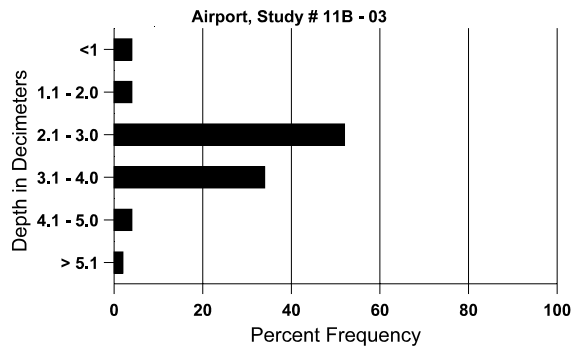
Cover Type	Average Cover %			
	'86	'94	'00	'05
Vegetation	3.25	21.21	27.20	24.29
Rock	.50	5.38	.18	.32
Pavement	18.00	5.61	9.19	12.31
Litter	50.75	15.90	14.14	18.38
Cryptogams	0	.11	1.45	.32
Bare Ground	27.50	31.23	47.47	53.56

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 3, Study Name: Airport

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
14.2	55.8 (13.5)	7.8	59.6	19.8	20.6	1.0	7.5	291.2	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 11B, Study no: 3

Type	Quadrat Frequency		
	'94	'00	'05
Rabbit	50	73	81
Elk	1	1	1
Deer	8	22	18
Cattle	4	10	2

Days use per acre (ha)	
'00	'05
-	-
-	-
24 (58)	27 (68)
2 (4)	10 (25)

BROWSE CHARACTERISTICS --

Management unit 11B, Study no: 3

		Age class distribution (plants per acre)					Utilization					
Y	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis												
86	1066	133	233	333	500	-	6	88	47	-	0	18/22
94	1120	520	180	780	160	220	0	2	14	4	4	22/34
00	2280	240	740	1300	240	340	28	4	11	4	4	18/23
05	3180	6240	1820	1120	240	320	9	4	8	5	5	20/29
Atriplex canescens												
86	0	-	-	-	-	-	0	0	0	-	0	-/-
94	20	-	-	20	-	20	0	0	0	-	0	44/63
00	20	20	-	-	20	-	100	0	100	-	0	44/56
05	20	580	20	-	-	-	0	100	0	-	0	38/64
Chrysothamnus viscidiflorus stenophyllus												
86	100	-	-	-	100	-	0	100	100	-	0	-/-
94	100	-	-	100	-	-	0	0	0	-	0	6/12
00	0	-	-	-	-	-	0	0	0	-	0	-/-
05	0	-	-	-	-	-	0	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization					
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Ephedra viridis</i>												
86	133	-	33	100	-	-	25	25	0	-	0	17/6
94	220	-	-	220	-	-	0	0	0	-	0	24/31
00	20	-	-	-	20	-	0	100	100	-	0	-/-
05	60	-	20	40	-	-	0	67	0	-	0	22/37
<i>Gutierrezia sarothrae</i>												
86	266	-	33	33	200	-	0	0	75	-	0	6/4
94	420	20	-	420	-	-	0	0	0	-	0	9/11
00	8940	120	180	7300	1460	100	0	.44	16	13	13	7/12
05	1460	2160	80	1360	20	80	0	0	1	-	0	8/12
<i>Juniperus osteosperma</i>												
86	0	-	-	-	-	-	0	0	-	-	0	-/-
94	0	-	-	-	-	-	0	0	-	-	0	-/-
00	0	-	-	-	-	20	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Opuntia polyacantha</i>												
86	432	-	33	233	166	-	0	0	38	-	38	4/6
94	260	-	-	240	20	-	0	0	8	8	8	3/15
00	240	20	-	220	20	-	0	0	8	-	0	3/6
05	100	-	-	100	-	-	0	0	0	-	0	5/15